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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/779,437	02/09/2001	Alfred A. Barney	01997-286001	6675

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EXAMINER

JAGAN, MIRELLYS

ART UNIT	PAPER NUMBER
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2859

DATE MAILED: 04/29/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/779,437

Applicant(s)

BARNEY ET AL.

Examiner

Mirellys Jagan

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other:

## DETAILED ACTION

### *Claim Objections*

1. Claims 11 and 12 are objected to because of the following informalities:

Claims 11 and 12: There is lack of antecedent basis in the claims for "the population".

Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

3. Claims 15-19 and 21-31 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,274,323 to Bruchez et al [hereinafter Bruchez].

Bruchez discloses a semiconductor nanocrystal in an organic or inorganic polymer (binder). The semiconductor nanocrystal includes a group II-VI, III-V, or IV semiconductor overcoated with a second semiconductor material. The nanocrystal includes an organic overlayer with a hydrolyzable moiety making the nanocrystal soluble, and is a member of a substantially monodisperse core population that emits light in a spectral range of no greater than 75nm at

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FWHM and exhibits less than a 15% rms deviation in diameter with a particle size in the range of about 15 to 125 Å (see column 8, line 67-column 9, line 32, column 9, lines 58-64, column 10, lines 4-12, column 16, lines 33-47, column 17, lines 48-53, column 20, lines 36-39, and column 21, line 44-column 22, line 26).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bruchez.

Bruchez discloses a semiconductor nanocrystal and binder having all of the limitations of claim 20, as stated above in paragraph 3, except for the overlayer including a metal alkoxide.

The use of the particular type of hydrolyzable moiety claimed by applicant, i.e., a metal alkoxide, absent any criticality, is considered to be nothing more than a choice of engineering skill, choice, or design because the use of the particular moiety claimed by applicant is considered to be nothing more than the use of numerous and well known alternate types of hydrolyzable moieties that a person of ordinary skill in the art at the time the invention was made would have been able to provide using routine experimentation in order to provide a hydrolyzable nanocrystal as already suggested by Bruchez.

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6. Claims 1-14 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,986,272 to Britton, Jr. et al [hereinafter Britton] in view of Bruchez.

Britton discloses a method of measuring temperature having the following steps:  
providing a temperature sensor on a surface of a substrate, the temperature sensor being a coating that is luminescent when irradiated with an excitation wavelength of light,  
irradiating a portion of the temperature sensor with an excitation wavelength of light,  
detecting emission of light from the sensor, and  
determining the temperature from the emission of light from the sensor.

Britton does not disclose the temperature sensor being a semiconductor nanocrystal in a binder.

Bruchez discloses that a semiconductor nanocrystal in an organic or inorganic polymer (binder) is luminescent when irradiated with an excitation wavelength of light. The semiconductor nanocrystal includes a group II-VI, III-V, or IV semiconductor overcoated with a second semiconductor material. The nanocrystal includes an organic overlayer with a hydrolyzable moiety making the nanocrystal soluble, and is a member of a substantially monodisperse core population that emits light in a spectral range of no greater than 75nm at FWHM and exhibits less than a 15% rms deviation in diameter with a particle size in the range of about 15 to 125 Å.

Referring to claims 1 and 48, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the semiconductor nanocrystal in a binder disclosed by Bruchez as the luminescent coating in the temperature measuring method disclosed

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by Britton, since these coatings are alternative types of luminescent coatings that can determine the temperature of a substrate.

Referring to claim 7, the use of the particular type of hydrolyzable moiety claimed by applicant, i.e., a metal alkoxide, absent any criticality, is considered to be nothing more than a choice of engineering skill, choice, or design because the use of the particular moiety claimed by applicant is considered to be nothing more than the use of numerous and well known alternate types of hydrolyzable moieties that a person of ordinary skill in the art at the time the invention was made would have been able to provide using routine experimentation in order to provide a hydrolyzable nanocrystal as already suggested by Britton and Bruchez.

Referring to claim 13, the semiconductor nanocrystal disclosed by Britton and Bruchez inherently have a quantum efficiency of at least 10%, since the applicant states in the specification that the semiconductor nanocrystals of the same type as those disclosed by Britton and Bruchez have quantum efficiencies of greater than 10% (see page 4, line 14).

7. Claims 32-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over the published article submitted by Applicant titled "Luminescent Thermometry For Aerodynamic Measurements" by Gallery et al [hereinafter Gallery] in view of Bruchez.

Gallery discloses a paint having a luminescent material mixed with a solvent, the luminescent material in the paint determining the temperature of a surface when it is irradiated with light. The paint may also have an additional pressure-sensitive composition, a platinum porphyrin, which emits light dependent upon the oxygen pressure when it is irradiated by an excitation wavelength of light. The paint is applied evenly to a surface to produce a thin and

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smooth coating, and is luminescent when irradiated with an excitation wavelength of light; the luminescence intensity of the material in the paint providing the temperature measurement.

Gallery does not disclose the luminescent material being a semiconductor nanocrystal in a binder.

Bruchez discloses that a semiconductor nanocrystal in an organic or inorganic polymer (binder) emits light independent of oxygen pressure and dependent upon irradiation by an excitation wavelength of light. The semiconductor nanocrystal includes a group II-VI, III-V, or IV semiconductor overcoated with a second semiconductor material. The nanocrystal includes an organic overlayer with a hydrolyzable moiety making the nanocrystal soluble, and is a member of a substantially monodisperse core population that emits light in a spectral range of no greater than 75nm at FWHM and exhibits less than a 15% rms deviation in diameter with a particle size in the range of about 15 to 125 Å. Bruchez discloses that the nanocrystal can be made to be soluble in different solvents, such as aqueous solutions or polymers, using techniques known in the art.

Referring to claims 32 and 43, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the semiconductor nanocrystal in a binder disclosed by Bruchez as the luminescent material in the temperature measuring paint disclosed by Gallery, since these materials are alternative types of luminescent materials that can be used to determine the temperature of a substrate when irradiated with light.

Referring to claim 39, the use of the particular type of solvent claimed by applicant, i.e., - an alcohol, absent any criticality, is considered to be nothing more than a choice of engineering skill, choice, or design because the use of the particular solvent claimed by applicant is

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considered to be nothing more than the use of numerous and well known alternate types of solvents that a person of ordinary skill in the art at the time the invention was made would have been able to provide using routine experimentation in order to dissolve the semiconductor nanocrystal and the binder and provide a smooth finish as already suggested by Gallery and Bruchez.

### *Conclusion*

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents disclose a method of measuring temperature by measuring the luminescence of a material:

U.S. Patent 4,448,547 to Wickersheim	U.S. Patent 5,730,528 to Allison et al
U.S. Patent 4,789,992 to Wickersheim et al	U.S. Patent 4,374,328 to Tekippe et al
U.S. Patent Application Publication 2002/0006153 to Ranson et al	

The following patents disclose nano-crystals:

U.S. Patent 6,236,060 to Chan et al	U.S. Patent 5,491,114 to Goldstein
U.S. Patent 5,434,878 to Lawandy	U.S. Patent 5,585,640 to Huston et al

The following patents disclose the use of luminescent materials as temperature sensors:

U.S. Patent 5,035,513 to Fehrenbach et al	U.S. Patent 4,776,827 to Greaves
U.S. Patent 5,036,194 to Hazel	U.S. Patent 5,213,985 to Sandroff et al



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The following patents disclose the use of luminescent paint as a temperature sensor:

U.S. Patent 5,008,136 to Chamberlain

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mirellys Jagan whose telephone number is 703-305-0930. The examiner can normally be reached on M-F 8:30-4:45.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F Gutierrez can be reached on 703-308-3875. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7725 for regular communications and 703-308-7725 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

mj  
April 25, 2002



**Diego Gutierrez**  
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